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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/220,970	12/23/1998	RANDELL L. MILLS	9213-4	5381

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EXAMINER	
CHEN, WENPENG	
ART UNIT	**PAPER NUMBER**
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/220,970	MILLS, RANDELL L.	
	Examiner	Art Unit	
	Wenpeng Chen	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *51-306* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *51-306* is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12/23/98* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Examiner's responses to Applicant's amendments and remark

1. Applicants' amendments filed on 6/29/09 have been fully considered.

a. The amendments overcome the followings set forth in the previous Office Action dated 3/31/2009:

-- Claims 51-117 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 127-155 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 271-280 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 294-298 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 156 and 281-284 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 160-227, 228-236, 237-265, 267-269, 270, 290-293, and 304-306 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter;

-- Claims 156 and 270 being rejected under 35 U.S.C. 112, first paragraph.

b. The amendments by cancellation make the followings set forth in the previous Office Action moot:

-- Claims 307-322 being rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Examiner's Remark about Remaining Issues

2. In the Non-Final Rejection dated 7/19/2001, Examiner Chen made objections to drawings and specification. The Applicant did not respond to the objections. They are restated below. The Applicant is requested to make responses to the objections.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the details of each block as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Each block in Figures 2, 4, and 5 has to be labeled. Correction is required.

4. The drawings are objected to because Figures 6 and 7 do not include labels for the axes shown in the figures. Correction is required.

5. The drawings are acceptable subject to correction of the informalities indicated above. In order to avoid abandonment of this application, correction is required in reply to the Office action. The correction will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities.

a. In the amendment files on 2/9/2001, a phase factor δ_s is used in the second equation in page 5. However, how to give a value of δ_s is not disclosed. Can it be any number? Or shall it be derived from the input data? If it is the latter, the step of derivation is not shown.

Examiner's Remark about Objection to Specification

set forth in Office Action dated 7/19/2001

7. In Office Action dated 7/19/2001, examiner Chen made the objection to specification shown below in "Citation A". The Applicant did not respond to the objection.

However, the records on the file implicitly distinguish the Applicant's processor from the conventional "Fourier transform processor." This is especially shown in the Appeal Brief filed on 9/03/2002, pages 4-5 ("Citation B"). The Board of Patent Appeals and Interferences ordered Examiner Chen to let the Applicant enter explicitly a definition related to applicant's "Fourier transform" in the specification ("Citation C"). The Applicant filed an amendment to specification on 5/3/2005 to provide a definition of his "Fourier series in Fourier space". Accordingly, Examiner Chen withdraws the objection shown in "Citation A".

"Citation A" -- from Office Action dated 7/19/2001

b. In second paragraph, page 8 of the original specification, the Applicant stated that "a Fourier transform processor encodes each data element as parameters of a Fourier component in Fourier space and store the data parameter values to the Input Layer section 24 of the memory 20." An example of a Fourier series in Fourier space is given by the equation shown in page 8. $N_{m\rho 0}$, N_{mz0}, ρ_{0m}, and z_{0m} in the equation are designated as the data parameters.

The paragraph has created confusion to the present examiner about how to implement the steps with the equation, because "Fourier transform" has a well-defined meaning mathematically. The transform, based on the equation shown in page 8, is not Fourier transform of the raw data, but transform to a frequency domain of a set of functions related to the raw data. It is improper to imply the transform, based on the equation shown in page 8, to be a Fourier transform of the raw data. Such an implication also causes the confusion whether $N_{m\rho 0}$, N_{mz0}, ρ_{0m}, and z_{0m} are inputs because they are associated with *data* or outputs of this transformation because they are associated with *parameters*?

On June 6, 2001, Examiner Chen had an interview with Mr. Jeffrey S. Meicher, Dr. Randell L. Mills, and Mrs. Jeffrey A. Simenauer. Examiner Chen thanks Dr. Mills for explaining the implementation of the steps by using the data obtained from the CCD array as an example. Dr. Mills stated that *the procedure disclosed in page 8 is not the conventional Fourier transform. The encoding procedure is to input data to generate parameters. The parameters are then used to generate the function described by the equation shown page 8. In the equation, k_z and k_ρ are independent variables of the function which is a wave function. The end result is Fourier series of some function related to the input data. The step of "encoding" is just associating the input data with the function as specified by the equation.* Signal representing the function can be used for correlation later on.

In the example, Dr. Mills explicitly made the following statements:

-- The "m" is an index to a CCD element, say element m.

-- $N_{m\rho 0}$, N_{mz0}, ρ_{0m}, and z_{0m} are derived from the amplitude of signal generated at the element m or the rate of change of the signal.

-- With the derived $N_{m\rho 0}$, N_{mz0}, ρ_{0m}, and z_{0m}, a Fourier component is generated.

-- M is the number of CCD elements used for the processing. Each Fourier component is also indexed with a "m."

-- The combination of the M Fourier components forms a Fourier series.

To reduce confusion, the Examiner here made the following suggestions. (1) While applicant may be his or her own lexicographer, the Examiner recommends changing "Fourier transform processor" to other term such as "frequency space processor" to distinguish the Applicant's processor from the conventional "Fourier transform processor." The frequency can be temporal or spatial frequencies. Or the applicant can state clearly that the Fourier transform is not the direct transform of the input data, but transform of a function related to the input data. (2) Define the meaning of m and M. (3) Replacing "encoding each data element as parameters" with "generating parameters with each data element." (4) State explicitly that "using the parameters together with wave functions to form a series."

"Citation B" -- from the Appeal Brief filed on 9/03/2002, pages 4-5

... "The claim term "Fourier series in Fourier space" is also distinguished from conventional Fourier series for the following additional reasons. The prior art cited by the Examiner teaches the use of a conventional Fourier transform of the form given by equations on pages 19-21 of Examiner's Answer, with the components in a conventional Fourier series has any physical meaning, and no single component may be independently modified without losing the connection to the real world object that the total series represents. Thus, for instance, the method of order formatting of strings according to the method of claims 127-156, 237-266, 271- 289, 294-312 and 315-318 cannot be reproduced using conventional Fourier series in neural networks. The ability to encode context of the ordered strings using modulation of the Fourier series at data parameterized frequencies, as recited in claim 266 also cannot be reproduced by using conventional Fourier series. In addition, the application of probability as the basis of forming associations and using probability based on prior activation rate as a basis to activate the components, as recited, for example, in claims 157-159, 267-269, 285-289, and 299-303, are unique.

An efficiency and universal applicability arise from the claimed structure. In contrast, the prior art processing based on standard Fourier series or transformed data stream and processing with neural networks has limited applicability. Based on the definitions of a standard transforms and neural networks and the corresponding mathematical representations and processing of data, the prior art can not perform the processing of a Fourier series in Fourier space or replicate the functions of the Appellant's invention, as discussed more fully below. Thus, all of the claims are allowable over the prior art." … (highlight added)

"Citation C" -- from Panel Remand to the Examiner by BPAI dated 03/22/2005

… In a Communication filed, via facsimile, on January 27, 2005, appellant responded to the Request For Information, with a paper providing explicit definitions for the terms "Fourier Series in Fourier Space" and "Probability Operand," and additionally pointed out the portions of the specification, as originally filed, that support these definitions. **The definitions provided define "Fourier Series in Fourier Space" as "[a] Fourier series in Fourier space is a sum of trigonometric functions in frequency space where each variable is frequency and the parameters of the Fourier series are input data or processed input data."** In addition, the definition provided for "Probability Operand" is "[a] probability operand is a system that returns a binary number in response to a probability-expectation-value or activation- probability-parameter input according to a specific statistic. The value of the operand causes a specific action, such as adding Fourier series to form a string, storing a summed Fourier series to memory, or activating a component of the system." **From our review of the information provided, we find that although it did not appear, at first blush, that the terms "Fourier Series in Fourier Space" and "Probability Operand," were described in the specification as filed, we are convinced that there is adequate basis for these terms in the originally filed specification.**

From the specific definitions provided, we find that the claims rejected over prior art distinguish over the applied prior art, for the reasons set forth by appellant in the briefs. ….

In view of the above discussion, **we remand this application to the examiner for** consideration of the above-noted matters and **entry of an amendment (to be filed) containing definitions for the terms "Fourier Series in Fourier Space" and "Probability Operand." …** (highlight added)

Allowable Subject Matter

8. Claims 51-306 are allowed.

a. The reason of allowance with regard to the prior art was explained previously in Office Action dated 12/21/2006. Claims 51-306 all comprise at least a feature related to one of **"Fourier Series in Fourier Space" and "Probability Operand"** defined in the amendment to specification dated 5/3/2005. To make the scopes of claims more clear, the Applicant recites explicitly in every independent claim the phrase "Fourier series in Fourier space", in the amendment filed on 6/29/2009, of which the meaning is defined in the application history. None

of the prior art teaches the feature(s) in combination with other limitations recited in Claims 51-306.

b. The reason of allowance not related to the prior art is given below.

-- In the decision of THE BOARD OF PATENT APPEALS AND INTERFERENCES of USPTO mailed on 11/28/2008, the Board expressed they understand how all the claimed subject matters are operational and can be implemented by following the description of the disclosure. Accordingly, they reversed the followings set forth in Office Action mailed on 12/21/2006: (a) Claims 51-322 being rejected under 35 U.S.C. 112, first paragraph and (b) Claims 51-322 being rejected under 35 U.S.C. 101 because they are non-operational and do not have utility. Examiner Chen respected the Board decision and withdrew the above rejections.

-- The amendments filed on 6/29/2009 overcome all the "35 U.S.C. 101" and the "35 U.S.C. 112, first paragraph" rejections set forth in Office Action dated 3/31/2009.

c. With the above reasons, Claims 51-306 are allowed.

Conclusion

9. This application is in condition for allowance except for the following formal matters:

-- Objections to drawings and specification set forth above.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 25 USPQ 74, 453 O.G. 213, (Comm'r Pat. 1935).

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 571-272-7431. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300 for regular communications and 571-273-8300 for After Final communications. TC 2600's customer service number is 571-272-2600.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

/Wenpeng Chen/
Primary Examiner, Art Unit 2624

October 23, 2009